

REMARKS

Claims 22 and 24-42 are pending in the above-captioned application. Claims 22 and 24-42 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Yoo et al., U.S. Patent No. 6,309,591 in view of Harada et al, U.S. patent No. 6,432,158.

As noted, the primary reference relied on in the Office Action for all obvious-type rejections is Yoo et al. As a foundation for the distinctions between the amended claims of the present invention and the Yoo et al. reference, it will be helpful to review the fundamental structural differences between the apparatus of Yoo et al. and the invention of the above-captioned application as well as what is not taught by the Yoo et al.

The cited reference to Yoo et al., teaches an apparatus for bonding a particle material to near theoretical density which includes means for applying high shear. High shear is utilized to deform an object wherein parallel planes remain parallel, but are shifted relative to one another. This is accomplished in Yoo et al., through the rotation of a plunger in contact with the material of which to be bonded. More specifically, Yoo et al. includes the use of a pulley in rotational engagement with a variable speed D.C. motor, via a belt and is illustrated in Fig. 12 of Yoo et al. The use of the rotating plunger with pulley in rotational engagement with the D.C. Motor provides for high shear which is quoted in Column 4 as causing “deformation of the powder particles, de-agglomeration of the particles and since they are in intimate contact it reduces the consolidation temperature.” Furthermore, as

provided in the portion of the specification detailing use and operation, Yoo et al. discloses that the rotating plunger applying shear force may rotate “at a speed of about 1-10 revolutions/min.”

Conversely, the above-captioned application relates to apparatuses for forming composites which can be used for friction bearing or structural applications. Notably, the present invention often creates compositions utilizing carbon fibers which typically have an aspect ratio equal to or greater than about 20:1 and preferably greater than 100:1, a length of from about 2-30 mm with a diameter of about 5-15 microns. Generally, with carbon fibers, having a length which is preferably at least 100 times the diameter, there is the risk of shearing the carbon fibers, thus diminishing their desirable characteristics. As such, the invention of the above-captioned application utilizes pistons with a hydraulic system to minimize shearing of the carbon fibers. Specifically, the hot press does not include equipment so as to rotate the pistons as rotation of the pistons would likely shear carbon fibers included within the fiber and matrix material.

Despite the Office Action stating that “Yoo discloses that the apparatus is capable of shaping composite material (see abstract) with preferably near theoretical density,” Yoo et al. could not be used to form or shape a mixture of carbon fibers and matrix material into a carbon/carbon composite material as the variable speed D.C. motor, pulley, and rotating plunger of Yoo et al. would likely

rupture carbon fibers through the application of shear. Even furthermore, Yoo et al. even identifies shear (resulting from the rotating plunger, pulley, D.C. motor components) as causing the “deformation of the powder particles, [and] de-agglomeration of the particles” which would also likely rupture carbon fibers. Quite simply, the rotating plunger would be detrimental and undesirable for the formation of a carbon/carbon composites formed from a fiber reinforcement as the integrity of the fibers would be compromised.

Applicant would like to additionally point out that “[t]o establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art” and “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.” MPEP §2143.03 (*citing In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)) " MPEP §2143.03 (*citing In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)). However, the Office Action’s rejection under 35 USC § 103, is without any examination or finding as to how the rotational plunger of Yoo et al. taught or suggested the invention of the above-captioned application as the device of Yoo et al. would likely produce undesirable results especially with forming carbon/carbon composites including carbon fibers.

Yet furthermore, the Office Action fails to point to why or how this would be suggested to one skilled in the art where “there must be some articulated reasoning

with some rational underpinning to support the legal conclusion of obviousness.”

See In re Kahn, 441 F.3d 977 (Fed. Cir. 2006). Simply, the Office Action cites to no other references as to the invention of the above-captioned application is obvious as the only similar reference utilizes a rotational plunger to provide shear which as described would be detrimental for applications of the invention of the above-captioned application and thus effectively teaches away from the invention of the above-captioned application.

Applicant believes that all of the pending claims are in condition for allowance and respectfully requests a favorable action to that effect.

CONCLUSION

Based on the foregoing remarks, it is believed that all claims 22 and 24-42 are in condition for allowance. Such action is earnestly sought. If there remains any matter which prevents the allowance of any of the pending claims, the Examiner is requested to call the undersigned collect at 615.242.2400 to arrange for an interview which may expedite prosecution.

A Request for Continued Examination is being filed herewith, in order to facilitate consideration of the remarks made herein.

Respectfully submitted,

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Examiner: Thukhanh T, Nguyen

on February 14, 2007.

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